

REMARKS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

THE REJECTIONS UNDER 35 U.S.C. § 112

Claim 2 had been rejected under Section 112, first paragraph, as allegedly failing to comply with the enablement requirement. This rejection is respectfully traversed.

The Examiner states that, "(t)he specification does not teach how the parallel sets of Figure 3 can be formed in the Figure 2 device with Figure 1 plates." It is respectfully submitted that the specification is clear on the configurations of these components. In the discussion of Fig. 1, from pages 4 through 6, the structure of the plate materials as a united set is explained. In the discussion of Fig. 2, beginning at the last paragraph of page 6, it is explained that a united set of plate materials are disposed in a holder, with suitable liquid connections and the like. And Figure 3 shows that a plurality of these united sets are connected in parallel. That is to say, a plurality of sets of plate materials are stacked within the assembled holder.

In this way, a repetitive pattern of sets can be maintained in a single holder, providing a mechanically simple structure. Also, such a set of parallel sets provides a high volume of mixed liquids to be obtained. Therefore, it is respectfully submitted

that the specification does in fact satisfy the enablement requirement, and that there are no grounds for rejecting claim 2 on this basis. Specific reference is made to the specification at page 5, line 18, as well as the paragraphs beginning at page 6, lines 12 and 23. It is respectfully requested that the Examiner either point out the particular language in the claim held to lack enablement, or else withdraw this rejection.

THE INVENTION

The present invention is directed to a mixer for a liquid chromatograph. In response to the previous rejection, claims 1 and 2 had been amended and new claims 3-10 have been added to more particularly point out and distinctly claim the subject matter regarded as the invention. As is disclosed in the present specification, and recited in the present claims, the mixer comprises a connected body including a plurality of plate materials.

The connected body includes first and second liquid supply holes, formed through each of the plurality of plate materials, for supplying first and second liquids. First and second supply flow passages are formed in one or more of the plate materials, for flowing the first and second liquids from the associated first and second liquid supply holes. A mixing flow passage is formed in one or more of the other of the plate materials, for collecting and mixing the first and second fluids from the first and second supply flow passages. One or more take-out holes are formed through the plurality of plate materials, for taking out mixed liquids mixed from the mixing flow passage.

As discussed hereinbefore, a plurality of plate material sets are connected in parallel such that a plurality of sets of plate materials are stacked within the assembled holder. In this way, a repetitive pattern of sets can be maintained in a single holder, providing a mechanically simple structure. Also, such a set of parallel sets produces a relatively high volume of mixed liquids. The mixer structure as disclosed and presently claimed is very different from the prior art relied upon by the Examiner.

THE REJECTIONS UNDER 35 U.S.C. §§ 102 and/or 103

Claim 1 had been rejected under Section 102(b) as anticipated, or in the alternative, under Section 103(a) as obvious over Ashmead et al. (U.S. Pat. No. 5,690,763). In a separate rejection, claims 1 and 2 had been rejected under Section 102(b) as anticipated, or in the alternative, under Section 103(a) as obvious over Ashmead et al. These rejections are respectfully traversed, particularly as applied to the claims as presently amended.

Ashmead et al. is directed to a very complex assembly for chemical processing having a plurality of laminae, for defining a three dimensionally tortuous channel, in order to provide a thorough reaction of reactant materials. As can be seen in Fig. 1 of this reference, a pair of inlet ports 20, 24 are shown for enabling the flow of reactants into the apparatus. A pair of outlet ports 30, 34 is shown for enabling the flow of reaction products out of the apparatus.

The Examiner has stated without qualification that this reference either anticipates the present claims, or that any difference therewith would reside in an

obvious optimizing of Ashmead et al. to enhance mixing. However, this statement fails to address the structural differences between Ashmead et al. and the present claims, particularly as presently amended.

It is clear from inspection that Ashmead et al. fails to disclose "a connected body including a plurality of plate materials connected together, said plurality of plate materials including first, second, and third plate materials, each of said plate materials defining a first liquid supply hole through which a first liquid flows, a second liquid supply hole through which a second liquid flows", as required. It is clear that the Ashmead et al. device does not have supply holes that are formed through each of the plurality of plate materials and thereby penetrate the entire connected body, as is the case with the present invention. Though Ashmead et al. does show a type of flow passages formed in the plates for flowing in and mixing reactants, Ashmead et al. clearly fails to disclose "a liquid take-out hole through which a mixture of the first and second liquids flows out of the connected body". As with the supply holes, the Ashmead et al. device does not have take-out holes that penetrate the entire connected body, as is the case with the present invention.

In view of the above, it is clear that the present invention is much more simple in construction than the device of Ashmead et al. It is respectfully submitted that the present invention would be easier to construct and would thus be more economical to manufacture than the very complex device of Ashmead et al. Also, the present invention provides a simplified, parallel construction in comparison with Ashmead, and is capable of delivering a high volume of mixed fluid that cannot be obtained with this previous-type device. It is therefore noted that the present invention is better suited to the requirements of liquid chromatography than the device of

Ashmead et al.

Further, the plurality of plate materials are retained within a holder, as recited in new dependent claims 5 and 9. Claims 6 and 10 further define that the plurality of plate materials define a set, and that a plurality of sets of plate materials are connected in parallel and received within the holder. Such structure is not taught or suggested by Ashmead et al. In view of the above, it is respectfully submitted that the present claims patentably distinguish over Ashmead et al. Reconsideration and withdrawal of these grounds of rejection is therefore respectfully requested.

Claim 2 had been rejected under Section 103(a) as obvious over Ashmead et al. in view of Hemker (U.S. Pat. No. 3,856,270). This rejection is also respectfully traversed, particularly as applied to the claims as presently amended.

Hemker discloses a static fluid mixing apparatus. Hemker is cited in this rejection for disclosing "a repeating series of plates". The Examiner proposes to modify Ashmead et al. to comport with Hemker in order to provide "rapid and thorough mixing". However, as originally presented, claim 2 was not directed to a "repeating series of plates," so this combination would not have satisfied the requirements of claim 2, as originally presented.

Claim 2 further defines the structure of claim 1 by reciting that "the connected body comprises a plurality of sets of plate materials, each plate material set including said first, second, and third plate materials". Claim 2 further recites that "the plurality of sets are connected together such that the first liquid supply holes are in a first location so as to be in fluid communication with one another, the second liquid supply holes are in a second location so as to be in fluid communication with one another, and the liquid take-out holes are in a third location so as to be in fluid

communication with one another", i.e. the penetration holes in each of the plate materials are in "registration." Clearly, there is no such disclosure of such penetration holes in Hemker, and Hemker teaches away from the present invention. Therefore, even if the combination of Ashmead et al. and Hemker could be contemplated, as proposed by the Examiner, it would still fail to satisfy the requirements of claim 2.

The above notwithstanding, it is further noted that Hemker fails to correct the deficiencies of the base rejection of Ashmead et al. as applied to claim 1. Therefore, it is respectfully submitted that the claim 2 would be allowable for at least the same reasons as claim 1. Reconsideration and withdrawal of this rejection is therefore respectfully requested.

Claim 1 had been rejected under Section 102(a) as anticipated, or in the alternative, under Section 103(a) as obvious over Japanese Patent Publication No. 2003-156481. Claim 2 had been rejected under Section 103(a) as obvious over Japanese Patent Publication No. 2003-156481 in view of Hemker. These rejections are also respectfully traversed, particularly as applied to the claims as presently amended.

It should be noted that the Japanese Patent Publication No. 2003-156481 has a publication date of May 30, 2003. However, the priority document in support of the present application has a filing date of August 28, 2002, antedating the date of the publication. It is further noted that JP 2003-156481 and the present application have the same inventor/applicant. The Examiner is referred to the attached copy of the Patent Abstracts of Japan for the JP 2003-156481 publication. Accordingly, it is respectfully submitted that Japanese Patent Publication No. 2003-156481 is not a

prior art reference under Section 102 and the rejection is moot. In light of this fact, reconsideration and withdrawal of these rejections is therefore respectfully requested.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. NGB-14961.

Respectfully submitted,

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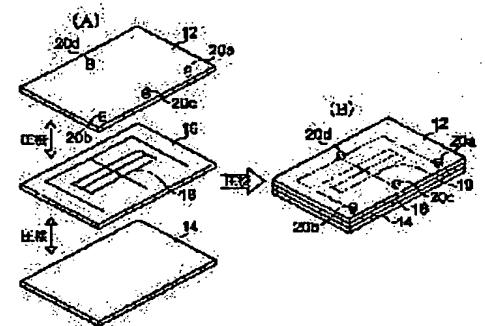
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(54) LIQUID CHROMATOGRAPH AND ELUATE MIXING DEVICE THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a mixing device easy to assemble, capable of being reduced in content capacity, and easily forming a desired mixing passage.

SOLUTION: This mixing device is constituted by sandwiching and bonding integrally a sheet metal 16 having a passage 18 formed thereon between upper and lower metal corrosion-resistant plats 12, 14. The sheet 16 is a stainless corrosion-resistant metal plate having the thickness of 2 mm or less, and the corrosion-resistant plates 12, 14 are metal plates made of the same material. Four through holes 20a-20d are bored on the upper corrosion-resistant plate 12 corresponding to the passage 18. Two holes among the four holes 20a-20d are used a eluate supply ports, and either of the other two holes is selected and used as an output port for mixed eluate.



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